

interesting subject-matter, are much duller compilations. The title "American" is given its widest possible connotation, for whereas Benjamin Thompson, later Count Rumford, was born in America, and with American versatility, served on both sides in the Revolutionary war, yet the whole of his scientific career was passed in Europe, and in London he founded the Royal Institution; on the other hand, Louis Agassiz was born in Switzerland, and only went to America as a man of science of established reputation when he was forty years of age. The word "leading" also by no means always signifies pre-eminence in research, for amongst the seventeen immortals we find the names of chemists like Silliman, and zoologists like Baird and Goode, who are remembered rather for their successful efforts to build up scientific institutions than for "epoch-making" research. The two last-named are associated with the development of the United States Fish Commission, and Dr. Goode, in addition with the building up of the National Museum in Washington.

But amongst the most interesting biographies from certain points of view is that of Prof. Willard Gibbs, who devoted his life to the working out of abstruse principles in mathematical physics, and produced results of such high importance that American students studying physics in Berlin were set to master the work of their own fellow-countryman, about which they had previously known nothing. That in a country so full of "hustle" and of the utilitarian spirit, a position should be found for such a man in which the sole duties were to instruct four or five advanced students in his speciality, augurs well for the intellectual future of America. A similar feeling is called to one's mind by the case of a brilliant investigator prematurely cut off, whose name has been, as we think, unadvisedly, omitted from this list; we refer to Prof. Charles Ward Beecher, of Yale, who described the anatomy of *Trilobita*. In his case also his teaching duties were light, and did not extend over more than five or six weeks in the year, and all the rest of his time was devoted to research; and the tangible results of his researches in palæontology, after they had been described in publications, were deposited in the museum, which was in this way built up. If with Prof. Cattell we consider that

"if he is to be regarded as a benefactor who makes two blades of grass grow in the place of one his services would be immeasurably greater who could enable two men of science to flourish where one had existed before,"

then the University of Yale, to which Prof. Willard Gibbs also belonged, must take high place in the rank of benevolent institutions.

One of the most valuable features of the volume under review is the account which it gives of the investigations of those of its subjects who were renowned for research. This account is presented in such a way as to be intelligible to the reader who is not a specialist. The editor, President Jordan of Leland Stanford University, has prefixed a preface in which are some things well worthy of being emphasised. "In the extension of coordination of human experience," he says, "lies the only permanent wealth of nations. And in

this view is found the keynote of the present volume." Again:—

"As we understand better the universe around us our relations to others and to ourselves, the behaviour of our race becomes rationalised. It becomes possible for us to keep ourselves clean and to make ourselves open-minded, friendly, and God-fearing."

The spirit to which these lines give expression and which is reflected in the lives recorded in this volume is the better leaven of democracy. While to many at a distance the American Republic seems a seething mass of blatant and utterly unscrupulous commercialism in which the professor is regarded by the rich as a mere hired servant, and by the poor as a half lunatic "crank," yet on a nearer view it is seen that his disinterested devotion to truth does not fail of its reward, for nowhere else in the world are the dicta from the professorial chair given such wide publicity by the Press, and nowhere else have they such influence with the "sober second thoughts of democracy."

E. W. M.

THE FABRIC OF PHARMACY.

Chronicles of Pharmacy. By A. C. Wootton. Vol. i., pp. xii + 428. Vol. ii., pp. v + 332. (London: Macmillan and Co., Ltd., 1910.) Price, two vols., 21s. net.

IN the preface to this very interesting and attractive work, Mr. Wootton tells his readers that his original intention was to trace back to their authors the formulas of the most popular of our medicines, but that during the course of his researches he was tempted to stray into various by-paths. Few of those who take up the "Chronicles of Pharmacy" will regret that the author succumbed to such temptation and extended his investigations beyond the limits to which he had originally intended to restrict them.

The title is well chosen. The work does not profess to be a systematic history of pharmacy but a series of contributions in which the author shows how kings, quacks, philosophers, priests, men of science and others have contributed to build up the fabric of pharmacy and mould it into its present form. It has been well said that no subject can be thoroughly grasped and properly appreciated until its history is known, and this is undoubtedly true of pharmacy, yet how few pharmacists have any adequate knowledge of their profession or of the long series of modifications through which many of the preparations they daily handle have passed before acquiring the composition given to them to-day? Such information Mr. Wootton now offers them, and in a form so fascinating that, having once commenced to read, it is difficult to lay the work aside until the end is reached. From first to last the attention of the reader is riveted to the subject by the romance which the author has so skilfully delineated.

The work is divided into twenty-four chapters. From the first, which deals with the myths of pharmacy, the author passes to pharmacy in the time of the Pharaohs, of the bible, of Hippocrates, of Galen, of the Arabians, and of Great Britain. "Dogmas and Delusions," "Masters in Pharmacy," "Royal Pharmacists," "Chemical Contributions to Pharmacy,"

and "Medicines from the Metals" complete the first volume. Of the ten chapters in the second volume the most interesting are "Animals in Pharmacy," "Some Noted Drugs," "Familiar Medicines," "Noted Nostrums," and "Names and Symbols."

The state of pharmacy in the time of the Pharaohs is illustrated by a very concise but sufficiently complete account of the celebrated Papyrus Ebers, which is made more realistic by the reproduction of one of its pages. Comparison of the preparations prescribed in this historically invaluable collection of recipes with those employed in this country three thousand years later affords food for reflection; such comparison is easy, for several of the paragraphs are literally translated, and can be read side by side with several from Cockayne's "Leechdoms, Wortcunning and Starcraft," which soon follow in the same volume. The chapter in which these are quoted ("Pharmacy in Great Britain") makes very interesting reading for British pharmacists. Here the reader is introduced to a number of celebrities who have taken active part in the development of pharmacy in this country, and is made acquainted with the circumstances that ultimately resulted in the formation of the Pharmaceutical Society of Great Britain.

But perhaps the most interesting and certainly the most novel chapters in the work are the three that deal with "Noted Drugs," "Familiar Medicines," and "Noted Nostrums." In them the author was at his best, and it is not difficult to see that these were the chapters that lay nearest his heart. They constitute the first systematic attempt to compile a history of preparations and medicines the names of many of which are household words. Black draught, diachylon plaster, Dover's powder, sal volatile, hiera picra, and many others are discussed. The expert will speedily realise the lengthy and patient investigation that must have been needed to discover and sift the facts here presented in small compass. Full use has evidently been made of the literary treasures in the library of the Pharmaceutical Society, where Mr. Wootton was frequently to be seen deeply engaged in the study of old volumes. Probably few pharmacists are aware that the original formula for diachylon plaster was compiled during the reign of the Emperor Tiberius, or that hiera picra could be purchased in Rome or Alexandria two thousand years ago as it can be in London to-day; in both cases the principal constituents have remained the same though the adjuncts have varied. So also the chapter on "Noted Nostrums" contains most instructive accounts of remedies so familiar to the pharmacist as James's fever powder, Ward's paste, St. John Long's liniment, Warburg's tincture, and others. Moreover, it is impossible to read these chapters without insensibly acquiring a considerable knowledge of the changes through which pharmacy itself has passed.

Mr. Wootton's "Chronicles of Pharmacy" must be regarded as a very valuable contribution to the history of pharmacy, particularly in this country. It is written in scholarly style, is of absorbing interest, and shows abundant evidence of painstaking research. Though the pleasure felt in perusing it is tempered with regret that the author should not have lived

to see the publication of his work, it is fortunate he should have had, in Mr. Peter MacEwan, an accomplished literary friend, able and willing to undertake the task of revising the proofs before the work was finally submitted to the public.

HENRY G. GREENISH.

THE CHICAGO TEXT-BOOK OF BOTANY.

A Text-Book of Botany for Colleges and Universities.

By Prof. J. M. Coulter, late Prof. C. R. Barnes and Prof. H. C. Cowles. Vol. i., Morphology and Physiology. Pp. viii+484+xii. (New York: American Book Co., 1910.) Price 2 dollars.

IT is a difficult task, nowadays, to write a text-book of botany, because the subject has become so large as to render it impossible to treat even the more important sections of it within reasonable limits of space. Any attempt of this kind must be judged on the basis laid down by the authors, and from this point of view we think the new Chicago text-book has scored a distinct success.

The subject-matter is divided into morphology, dealt with by Prof. Coulter, physiology by the late Prof. Barnes, and ecology by Prof. Cowles. In the volume just issued the first two topics are treated. The section of ecology will, we understand, be published shortly. The book as a whole is organised on the general plan of study pursued at the Hull Botanical Laboratory of the University of Chicago, and general interest will be aroused in its appearance since this laboratory is one of the most active centres of botanical research in America.

We confess to a feeling that the subject has suffered from compression, but it may be taken, after all, that the text-book is rather a reminder than a source of the more important topics of instruction given in the lecture-room and the laboratory. One feels this, especially in the portion dealing with morphology. Prof. Coulter must have found it a hard task to pick out of the immense mass of material just the matter that would best serve his purpose, but we fancy that many who belong to a class more advanced than those who are officially known as students, will find the book useful. He has, we think, very successfully eluded the rather stereotyped grooves, and has modified the perspective of his part of the work. There is a freshness, and that indefinable sense of first-hand acquaintance with the matter in hand, which in spite of the inevitable brevity imposed by limitations of space, cannot fail to appeal favourably to the reader.

After a general survey of the various groups of plants, in which not only the results of recent work are incorporated, but a large number of new figures are introduced, Prof. Coulter concludes with a chapter on organic evolution. It need scarcely be said that the pages devoted to this question are interesting, but we feel inclined to join issue with the author on one point. In dealing with variation, he says that the difference between what is known as natural selection and mutation consists in the fact that the former deals with fluctuating variations which are small, while the latter depends on large variations. But surely the matter is not really a quantitative but a